

REMARKS

The present Amendment is in response to the Examiner's Office Action mailed March 31, 2003 ("Office Action"). Claims 1-17, 20, 21, 23, 24, 27, 31, and 33-85 have been canceled without prejudice. Claims 18, 19, 22, 25 and 29 have been amended. New claims 86-114 have been added. Claims 18, 19, 22, 25-26, 30, 32 and 86-114 are now pending.

Rejection of Claims

Independent claim 18, and the claims depending therefrom, were rejected as being anticipated or rendered obvious by US Patent No. 6,105,588 ("Li"), either alone or in view of U.S. Patent No. 5,292,370 ("Tsai") or U.S. Patent No. 4,961,820 ("Shinagawa"). The Office Action indicates that "Li et al teach a method as claimed. See the entire reference, especially Fig. 1, the related description and columns 3-7."

The Applicant respectfully traverses the rejection. Independent claim 18 as amended is directed at a method of removing photoresist using a hydrogen containing gas as the principal reactive gas at a pressure of less than about 200mTorr. Li describes processes from "about 0.5 to about 5 Torr, and preferably from about 2 to about 4 Torr." See column 4, lines 59-60. The examples in the tables in Li are at pressures of 2 Torr or 3 Torr. Therefore, independent claim 18 as amended is not anticipated by Li.

In addition, independent claim 18 is not rendered obvious by Li. Photoresist strip is typically performed at higher pressures to achieve viable processing rates and avoid damage to sensitive features on the substrate by high energy ions at low pressures. Li specifically teaches pressures above about 0.5 Torr and preferably even higher pressures of from about 2 Torr to 4 Torr. Since Li specifically teaches away from the claimed invention, claim 1 is not rendered obvious by Li.

The other references cited by the Examiner do not avoid the deficiency of Li.

Shinagawa discloses a pressure of about 0.8 Torr at column 7, line 48. The Examiner also cited Tsai as teaching lower pressures. Tsai discloses an ECR microwave plasma source developed to produce plasmas of argon, helium, hydrogen, oxygen, etc., at operating pressures in the range from 0.1 to 10 mTorr. See column 3, lines 50-52. While Tsai discloses a plasma source capable of producing a low pressure plasma, it does not teach a method of removing photoresist using a hydrogen containing gas as the principal reactive gas at a pressure of less than about 200mTorr. Li specifically teaches away from the use of the pressures disclosed in Tsai for the processes disclosed in Li. While Li discloses that other types of plasma sources may be used to produce the plasma used for the processes disclosed in Li, Li does not teach that the pressure and other properties of the plasma used for such processes may be arbitrarily changed and in fact suggests that higher pressures are preferred. As described above, higher pressures are typically used for photoresist strip (as opposed to certain types of anisotropic ion etch for other processes) and the mere fact that a plasma source such as Tsai is capable of creating a hydrogen plasma at low pressure would not suggest the use of such plasma for the processes disclosed in Li, particularly if hydrogen is used (which would typically be expected to have lower processing rates for photoresist removal than oxygen which is more commonly used for stripping).

In view of the above, it is believed that claim 18 is patentable over Li, alone and in view of the other cited references. Claims 19, 22, 25-26, 30, 32 and 86-105 depend directly or indirectly from claim 18 and therefore are also believed patentable. New claims 106-114 are directed at a method of removing a residue using a hydrogen containing gas as the principal reactive gas at a pressure of less than about 200mTorr and are also believed patentable over the cited references.

CONCLUSION

Reconsideration of the application is respectfully requested in view of the above amendments and remarks. It is Applicants' belief they are entitled to a letters patent and respectfully solicit the Examiner to expedite prosecution of this patent to issuance. Should the Examiner have any questions, the Examiner is encouraged to telephone the undersigned.

Respectfully submitted,

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